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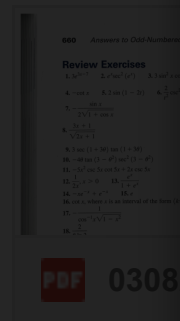
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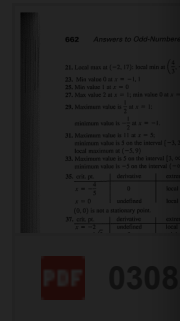
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## 662 Answers to Odd-Numbered Questions

21. Local max at  $(-2, 17)$ ; local min at  $(\frac{4}{3}, -\frac{41}{27})$ 23. Min value 0 at  $x = -1, 1$ 25. Min value 1 at  $x = 0$ 27. Max value 2 at  $x = 1$ ; min value 0 at  $x = -1, 3$ 29. Maximum value is  $\frac{1}{2}$  at  $x = 1$ ;minimum value is  $-\frac{1}{2}$  at  $x = -1$ .31. Maximum value is 11 at  $x = 5$ ;minimum value is 5 on the interval  $[-3, 2]$ ;local maximum at  $(-5, 9)$ 33. Maximum value is 5 on the interval  $[3, \infty)$ ;minimum value is  $-5$  on the interval  $(-\infty, -2]$ .

35. crit. pt.	derivative	extremum	value
$x = -\frac{4}{5}$	0	local max	$\frac{12}{25}10^{1/3}$
$x = 0$	undefined	local min	0

 $(0, 0)$  is not a stationary point.

37. crit. pt.	derivative	extremum	value
$x = -2$	undefined	local max	0
$x = -\sqrt{2}$	0	minimum	-2
$x = \sqrt{2}$	0	maximum	2
$x = 2$	undefined	local min	0

 $(-2, 0)$  and  $(2, 0)$  are not stationary points.

39. crit. pt.	derivative	extremum	value
$x = 1$	undefined	minimum	2

 $(1, 2)$  is not a stationary point.

41. crit. pt.	derivative	extremum	value
$x = -1$	0	maximum	5
$x = 1$	undefined	local min	1
$x = 3$	0	maximum	5

 $(1, 1)$  is not a stationary point.43. (a) Max value is 144 at  $x = 2$ . (b) The largest volume of the box is 14 cubic units and it occurs when  $x = 2$ .45. False. For example, the maximum could occur at a corner, where  $f'(c)$  would not exist.

47. E 49. B

51. (a) No

(b) The derivative is defined and nonzero for  $x \neq 2$ . Also,  $f(2) = 0$ , and  $f(x) > 0$  for all  $x \neq 2$ .(c) No, because  $(-\infty, \infty)$  is not a closed interval.(d) The answers are the same as (a) and (b) with 2 replaced by  $a$ .53. (a)  $f'(x) = 3ax^2 + 2bx + c$  is a quadratic, so it can have 0, 1, or 2 zeros, which would be the critical points of  $f$ . Examples:The function  $f(x) = x^3 - 3x$  has two critical points at  $x = -1$  and  $x = 1$ .